WHAT IS CLAIMED IS

1. A retroreflector comprising a plastic layer composite including

at least one transparent structure layer,

a protective layer, and

a reflection layer enclosed at a common interface between the structure layer and the protective layer, the reflection layer including a relief structure which is formed by substantially identically shaped three-dimensional structure elements having base surfaces of lateral dimensions in a range of between 1 μm and 200 μm and having side faces which are covered with the reflection layer, the side faces being at an angle of inclination of 45° relative to a free surface of the layer composite,

wherein the layer composite has at least one surface element in which the relief structure is superimposed with a microstructure distinguished by a preferred direction and for influencing the quality of the reflection action of the layer composite the microstructure in each surface element has a single preferred direction.

2. A retroreflector as set forth in claim 1

wherein the structure layer has a side remote from the reflection layer,

and including

a base film of a transparent abrasion-resistant and tension-resistant plastic material, the base film being joined to said side of the structure layer that is remote from the reflection layer.

3. A retroreflector as set forth in claim 1

wherein the structure elements are arranged non-periodically.

4. A retroreflector as set forth in claim 1

wherein the reflection layer is metallic.

5. A retroreflector as set forth in claim 1

wherein the microstructure is a linear diffraction grating with the preferred direction and has a grating period of shorter than 500 nm and an optically effective fine structure depth is of a value of a range of between 20 nm and 1000 nm.

6. A retroreflector as set forth in claim 5

wherein for maximum polarisation efficiency of the diffraction grating the grating period is shorter than 350 nm and the fine structure depth is limited to a range of between 100 nm and 150 nm.

7. A retroreflector as set forth in claim 5

wherein the reflection layer comprises a metal which is a good electrical conductor.

8. A retroreflector as set forth in claim 7

wherein said metal is selected from a group consisting of silver, aluminum, gold and an alloy having one of said metals as a main component.

9. A retroreflector as set forth in claim 5 including

a matt structure superimposed over the diffraction grating.

10. A retroreflector as set forth in claim 1

wherein the microstructure is an anisotropic matt structure with the preferred direction.

11. A retroreflector as set forth in claim 8

wherein said matt structure has a mean roughness value in a range of between 500 nm and 1000 nm and a correlation length of between 500 nm and 10,000 nm.

12. A retroreflector as set forth in claim 10

wherein said matt structure has a mean roughness value in a range of between 500 nm and 1000 nm and a correlation length of between 500 nm and 10,000 nm.

13. A retroreflector as set forth in claim 1

wherein said layer composite has a surface divided into said surface elements and into a background area, and

the microstructures in the surface elements and in the background area differ only in respect of the azimuth value of the preferred directions.

14. A retroreflector as set forth in claim 13

wherein the surface elements form on the background area a machine-readable optical marking in the form of a bar code, and

wherein the surface elements have a first said preferred direction and the background area has a second said preferred direction, said first and second preferred directions differing by the azimuth value from a range of between 30° and 90°.

15. A retroreflector as set forth in claim 5

wherein said layer composite has a surface divided into the surface elements of an image pattern,

wherein the preferred directions of the matt structures used for the microstructure are identically oriented in the surface elements, and

wherein the surface elements differ only in respect of the color of the transparent structure layer.

16. A retroreflector as set forth claim 5 including

a transparent base film joined to a side of the structure layer, that is remote from the reflection layer,

wherein said layer composite has a surface divided into the surface elements of an image pattern,

wherein the preferred directions of the matt structures used for the microstructure are identically oriented in the surface elements, and

wherein the surface elements differ only in respect of the color of the base film.

17. A retroreflector as set forth in claim 1

wherein the layer composite has at least one surface part which is free from the relief structure and,

wherein said surface part has an optically diffractive grating and is arranged in adjacent relationship with surface elements occupied by relief structures superimposed with microstructures.

18. A retroreflector as set forth in claim 17

wherein the gratings of adjacent surface parts differ in respect of at least one of the grating parameters.

19. A retroreflector as set forth in claim 17

wherein at least one surface part extends with a width in a range of between 0.02 and 0.2 mm over at least one group formed from the surface elements, the background field and a further field.

20. A retroreflector as set forth in claim 18

wherein at least one surface part extends with a width in a range of between 0.02 and 0.2 mm over at least one group formed from the surface elements, the background field and a further field.

21. A retroreflector as set forth in claim 1

wherein the protective layer has a surface remote from the structure layer and on said remote surface the protective layer has an adhesive layer for joining the layer composite to a substrate.